

I Claim:

017 5 In combination, a free standing, unsecured intravascular device for contact with the inner wall of a blood vessel and an elongate guidewire for extending longitudinally through and beyond said intravascular device and adapted for free longitudinal movement relative thereto, the combination comprising:

10 an intravascular device having a contracted configuration and an expanded configuration to an expanded outer dimension for contact with an inner wall of said blood vessel, said intravascular device including an elongate wire receiving unit having an open ended channel extending therethrough, said wire receiving unit having an outer dimension which is less than the expanded outer dimension of said intravascular device and said channel having a channel inner dimension for receiving said guidewire, and

15 said guidewire having an elongate flexible body extending along a longitudinal axis between a proximal end and a distal end, said flexible body having an outer dimension which is less than the inner dimension of said channel to permit free movement of said guidewire relative to said intravascular device within said channel in opposite directions along the longitudinal axis of said guidewire, said guidewire extending through said channel and beyond said intravascular device to position said intravascular device in spaced relationship to the proximal and distal ends of said guidewire.

25 2. The combination of claim 1 wherein said guidewire includes an expandable and contractable stop member mounted thereon which is movable between a first contracted position and a second expanded position, said expandable and contractable stop member being dimensioned to pass through said channel in the first contracted position thereof and being dimensioned in the second expanded position

17

thereof to have an outer dimension which is greater than the inner dimension of said channel but less than the outer dimension of said intravascular device in the expanded configuration thereof whereby said expandable and contractable stop member is radially spaced from the inner wall of said blood vessel in the second expanded position thereof.

5

2 3. The combination of claim 2 wherein said expandable and contractable stop member is spaced from both the proximal and distal ends of said guidewire body.

10

3 4. The combination of claim 2 wherein said expandable and contractable stop member includes a thin walled body member mounted upon and surrounding said guidewire and dimensioned to pass with said guidewire through said channel in the first contracted position of said contractable stop member, said thin walled body member having a body member distal end portion secured to said guidewire and a sliding portion extending toward the proximal end of said guidewire, said sliding portion being longitudinally slidable relative to said guidewire toward the distal end of said guidewire to cause the thin walled body member to bow outwardly from said guidewire adjacent to the body member distal end portion to form the second expanded position of said expandable and contractable stop member.

15

20

4 5. The combination of claim 2 wherein said guidewire is formed with an internal chamber extending from the proximal end of said guidewire toward said distal end thereof, and a stop member operating mechanism is mounted in said internal chamber to move said expandable and contractable stop member between said first contracted and second expanded positions.

25

5 6. The combination of claim 5 wherein said guidewire body includes at least one opening formed to extend into said internal chamber, said expandable and contractable stop member including at least one stop unit retractable through said

opening into said internal chamber to the first contractable position of said expandable and contractable stop member and extendable outwardly through said opening to the second expanded position of said expandable and contractable stop member.

5

6. The combination of claim 5 wherein said at least one stop unit includes a boss element which extends through said opening and a mounting arm secured within said internal channel to said boss element and to said guidewire body.

10

7. The combination of claim 6 wherein said stop member operating mechanism includes an elongate cam actuator movable within the internal chamber to engage said stop unit and force said boss element to move outwardly through the opening in said guidewire body to the second expanded position of said expandable and contractable stop member.

15

8. The combination of claim 7 wherein said mounting arm is formed to bias said boss unit into said internal chamber.

20

9. The combination of claim 8 wherein said guidewire body includes two opposed openings into said internal chamber, and said expandable and contractable stop member includes a boss element extending through each said opening, each said boss element being secured within said internal chamber to a separate mounting arm secured to said guidewire within said internal chamber.

25

10. The combination of claim 9 wherein said elongate cam actuator is movable between said boss elements to engage and force said boss elements outwardly through said openings.

11 12. The combination of claim 11 wherein the mounting arm for each boss element is formed to bias said boss element into said internal chamber.

5 12 13. The combination of claim 5 wherein said expandable and contractable stop member includes at least one elongate strip of material which engages said stop member operating mechanism within said internal chamber and is extendable thereby through said at least one opening in said guidewire.

10 13 14. The combination of claim 13 wherein said strip of material is spring metal.

14 15. The combination of claim 13 wherein said strip of material is formed of temperature responsive shape memory material.

15 15 16. The combination of claim 5 wherein said expandable and retractable stop member includes at least one barb having a first end secured externally to said guidewire body, said barb being formed to normally extend from said first end angularly outward from said guidewire to a second end of said barb, said guidewire body including at least one opening formed to extend into said internal chamber, and said stop member operating mechanism including an elongate tether connected to the second free end of said barb and extending through said opening into said internal chamber.

20 16 17. The combination of claim 16 wherein said barb is formed of flexible material which biases said barb angularly outward from said guidewire body, said tether operating to draw the second end of said barb against the bias toward said guidewire body.

17 18. The combination of claim 2 wherein said guidewire body is formed with an internal chamber extending from the proximal end of the guidewire body toward the distal end thereof, said expandable and contractable stop member including an inflatable unit secured externally to said guidewire body, said guidewire body including at least one opening connecting said internal chamber to said inflatable unit.

18 19. An elongate guidewire for use with a free, unsecured intravascular device having an expanded configuration for contact with the inner wall of a blood vessel and an elongate, enclosed, open ended channel having a channel inner dimension for receiving said guidewire, said guidewire comprising:

an elongate, flexible body extending along a longitudinal axis between a proximal end and a distal end, said flexible body having an outer dimension which is less than the inner dimension of said channel to permit free movement of said guidewire relative to said intravascular device within said channel along the longitudinal axis of said guidewire, and

an expandable and contractable stop member mounted on said guidewire body for movement between a first contracted position and a second expanded position, said expandable and contractable stop member being dimensioned in the first contracted position to move through said channel and being dimensioned in the second expanded position thereof to have an outer dimension which is greater than the inner dimension of said channel.

19 20. The combination of claim 18 wherein said expandable and contractable stop member includes a thin walled body member mounted upon and surrounding said guidewire and dimensioned to pass with said guidewire through said channel in the first contracted position of said contractable stop member, said thin walled body member having a body member distal end portion secured to said guidewire and a sliding portion extending toward the proximal end of said guidewire, said sliding portion being

longitudinally slidable relative to said guidewire toward the distal end of said guidewire to cause the thin walled body member to bow outwardly from said guidewire adjacent to the body member distal end portion to form the second expanded position of said expandable and contractable stop member.

5

20 21. The combination of claim 19 wherein said guidewire is formed with an internal chamber extending from the proximal end of said guidewire toward said distal end thereof, and a stop member operating mechanism is mounted in said internal chamber to move said expandable and contractable stop member between said first contracted and second expanded positions.

10

21 22. The combination of claim 21 wherein said guidewire body includes at least one opening formed to extend into said internal chamber, said expandable and contractable stop member including at least one stop unit retractable through said opening into said internal chamber to the first contractable position of expandable and contractable stop member and extendable outwardly through said opening to the second expanded position of said expandable and contractable stop member.

15

22 23. The combination of claim 22 wherein said at least one stop unit includes a boss element which extends through said opening and a mounting arm secured within said internal channel to said boss element and to said guidewire body.

20

23 24. The combination of claim 22 wherein said stop member operating mechanism includes an elongate cam actuator movable within the internal chamber to engage said stop unit and force said boss element to move outwardly through the opening in said guidewire body to the second expanded position of said expandable and contractable stop member.

25

24 25. The combination of claim 23 wherein said mounting arm is formed to bias said boss unit into said internal chamber.

5 25 26. The combination of claim 21 wherein said expandable and contractable stop member includes at least one elongate strip of material which engages said stop member operating mechanism within said internal chamber and is extendable thereby through said at least one opening in said guidewire.

10 26 27. The combination of claim 20 wherein said expandable and retractable stop member includes at least one barb having a first end secured externally to said guide-wire body, said barb being formed to normally extend from said first end angularly outward from said guidewire to a second end of said barb, said guidewire body including at least one opening formed to extend into said internal chamber, and
15 said stop member operating mechanism including an elongate tether connected to the second free end of said barb and extending through said opening into said internal chamber.

20 27 28. The combination of claim 26 wherein said barb is formed of flexible material which biases said barb angularly outward from said guidewire body, said tether operating to draw the second end of said barb against the bias toward said guidewire body.

25